

The Affordable Pre-Finishing of Silicon Carbide for Optical Applications, Phase I

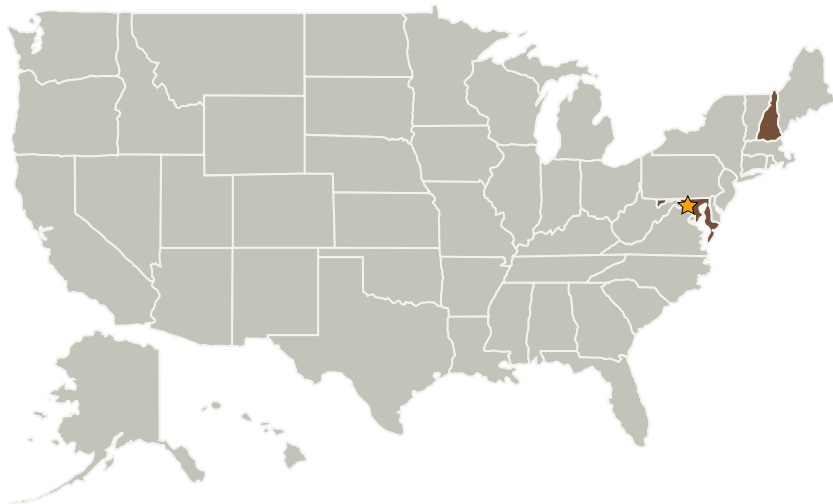
Completed Technology Project (2008 - 2008)



Project Introduction

Creare proposes to develop a novel, laser-assisted, pre-finishing process for chemical vapor deposition (CVD) coated silicon-carbide ceramics. Our innovation will enable the affordable single-point turning of CVD silicon carbide from a near-net shape blank to a pre-finished aspheric optic. We will use our extensive experience and expertise in the advanced machining of ceramics to establish the parameter space for the production of high-quality, pre-finished aspheric optics from near-net shape blanks. Our innovation has a material removal rate (MRR) that is two orders of magnitude higher than current pre-finishing options including diamond grinding, ductile-regime machining, reactive atom plasma processing, or standard laser micromachining. In addition, our approach has demonstrated that these high MRRs can be achieved with no surface or sub-surface damage, which is key to minimizing the cost of the subsequent finishing operation. Our novel solution is readily integrated with existing or new ultra-precision machine tools. Thus, our innovation is effective, affordable, and flexible.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Goddard Space Flight Center (GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Creare LLC	Supporting Organization	Industry	Hanover, New Hampshire



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations

Maryland

New Hampshire

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Jay Rozzi

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
 - └ TX12.4 Manufacturing
 - └ TX12.4.1 Manufacturing Processes